

BEFORE THE COMMISSIONER OF THE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION FOR THE STATE OF ALASKA

IN THE MATTER OF:

CONDITIONAL APPROVAL OF REVISED
DRAFT FINAL HUMAN HEALTH RISK
ASSESSMENT, FLINT HILLS RESOURCES
ALASKA, LLC, NORTH POLE REFINERY
(NOVEMBER 27, 2013)

**MEMORANDUM IN SUPPORT OF
REQUEST FOR ADJUDICATORY HEARING
18 AAC 15.200
SUBMITTED BY FLINT HILLS RESOURCES ALASKA, LLC**

I. INTRODUCTION

Pursuant to 18 AAC 75.385 and 18 AAC 15.200, Flint Hills Resources Alaska, LLC (“Flint Hills”) requests an adjudicatory hearing with respect to the Alaska Department of Environmental Conservation’s (“DEC”) decision regarding the groundwater cleanup level that is asserted in its letter to Flint Hills dated November 27, 2013.¹ DEC’s decision is based on an incorrect interpretation of the regulations and inadequate scientific justification.

Of the three potential responsible parties at the North Pole Refinery site--the State of Alaska, Williams Alaska Petroleum and Flint Hills--only Flint Hills has been participating in the ongoing process to address sulfolane contamination of

¹ Ex. E.

groundwater at the North Pole Refinery site, pursuant to DEC cleanup regulations. One of the key steps in the DEC process is to determine a protective groundwater cleanup level for sulfolane. Because DEC regulations do not set a groundwater cleanup level for sulfolane, a determination of a cleanup level must be made via a risk assessment. In 2012, Flint Hills submitted extensive and detailed scientific analyses in a site specific human health risk assessment, demonstrating scientifically-supported toxicity values for sulfolane, and a proposed groundwater cleanup level for sulfolane consistent with those toxicity values and other relevant data. The sulfolane cleanup level proposed by Flint Hills--362 micrograms per liter ($\mu\text{g/L}$)-- is fully protective of human health and the environment. DEC summarily rejected the scientific information submitted by Flint Hills in its November 27 letter. Without giving any explanation for its decision, and without explaining any reason for its rejection of alternative toxicity values and alternative cleanup levels, DEC determined that the groundwater cleanup level for sulfolane at the North Pole Refinery site is 14 $\mu\text{g/L}$, and directed Flint Hills to excise all contrary scientific information from future reports and plans.

As set forth in detail below, DEC's decision is not mandated by the regulations, and is contrary to sound science. Adoption of the sulfolane cleanup level selected by DEC would impose enormous cleanup costs, without any corresponding benefit to human health or the environment. Flint Hills therefore respectfully requests

an adjudicatory hearing to fully address and determine the proper groundwater cleanup level for sulfolane at the North Pole Refinery site.

II. BACKGROUND FACTS

The North Pole Refinery (“NPR”) is located on 240 acres just outside the city limits of North Pole, Alaska and 13 miles southeast of Fairbanks, Alaska, within the Fairbanks North Star Borough. Earth Resources Corporation of Alaska built the refinery in 1976-77 on land leased from the State of Alaska, and the refinery began operations in August 1977. MAPCO, Inc. acquired Earth Resources Corp. in 1980, and continued operations under a newly formed company, MAPCO Alaska Petroleum, Inc. In 1998, Williams Alaska Petroleum, Inc. acquired MAPCO through a stock purchase, thereby succeeding to MAPCO’s operations as Williams Alaska Petroleum, Inc. (“Williams”).

Williams acquired the land beneath the refinery from the State of Alaska on March 24, 2004. Williams conveyed the refinery assets and land to Flint Hills Resources Alaska, LLC (“Flint Hills”) effective on March 31, 2004. Flint Hills has owned and operated the refinery since then. Williams and its predecessors operated the NPR for almost 25 years before Flint Hills acquired the refinery assets from Williams in 2004.

The NPR is an active petroleum refinery that receives crude oil feedstock from the Trans-Alaska Pipeline System (“TAPS”).² Three crude oil processing units and an extraction unit are located in the southern portion of the refinery, making up the process area.³ Tank farms are located in the central portion of the NPR.⁴ Wastewater treatment lagoons, storage areas, and two flooded gravel pits (the North and South Gravel pits) are located in the western portion of the site.⁵ Rail lines and access roads are located in the northernmost portion of the site.⁶

Sulfolane (or tetrahydrothiophene 1, 1-dioxide) has been used at the refinery since approximately September 1985, when construction of the extraction unit was completed. Sulfolane is used to remove aromatic hydrocarbons, including BTEX compounds, from petroleum feedstock.⁷ Further processing captures those aromatics from the sulfolane and returns the sulfolane portion back into the process. The aromatics are then blended with other hydrocarbon mixtures to produce gasoline.⁸

² 2013 On-Site Characterization Work Plan, Feb. 1, 2013. [available at <http://dec.alaska.gov/spar/csp/sites/north-pole-refinery/docs/2013scwp-on-site.pdf>]

³ *Id.*

⁴ *Id.*

⁵ *Id.*

⁶ *Id.*

⁷ *Id.*

⁸ *Id.*

Historic releases of sulfolane occurred at NPR not only in the extraction unit but also in wastewater releases, particularly at Lagoon B, in sumps, and in areas where extraction unit equipment was cleaned. The vast majority of these releases occurred during the operation of the plant by Williams (and its predecessor, MAPCO).

In 2001, Williams reported to DEC that it had discovered the presence of sulfolane in groundwater within the NPR property boundary. Williams conducted limited sampling for sulfolane in 2001 and 2002. Upon acquiring the refinery in 2004, Flint Hills promptly resumed groundwater sampling for sulfolane and evaluating potential sulfolane sources. Those efforts led to Flint Hills' discovery of sulfolane at the northern refinery boundary in October 2008, which discovery was communicated to DEC.⁹ Thereafter, Flint Hills began diligently surveying potential offsite receptors for contaminated groundwater and installing groundwater monitoring wells beyond the property boundary.¹⁰ In October 2009, those initial offsite wells demonstrated that sulfolane contamination had migrated well beyond the property boundary.¹¹

Upon the discovery of the offsite migration of sulfolane, Flint Hills took decisive action and initiated a program to provide bottled water to all affected residents. Flint Hills also began developing sulfolane treatment technologies for

⁹ *Id.*

¹⁰ *Id.*

¹¹ *Id.*

household use. Extensive bench and pilot testing programs demonstrated the successful design and implementation of a point-of-entry (“POE”) treatment system that was certified by the Water Quality Association for public use.¹² The POE treatment system is one of the alternative water solutions Flint Hills has included in an Alternative Water Solutions Program, which program is documented in the Alternative Water Solutions Program – Management Plan that Flint Hills most recently revised and submitted to DEC in December 2013.

In March 2010, DEC directed Flint Hills to submit a Site Characterization Report and a Feasibility Study. Since then, Flint Hills has submitted numerous work plans, studies and reports to DEC.¹³ In July 2013, DEC issued a schedule for future submittals to Flint Hills (without requiring the participation by any other responsible party).¹⁴ This schedule calls for Flint Hills to submit the following reports over the next fifteen months, culminating in Final Cleanup Plans in March 2015:

Draft Site Characterization Reports	December 20, 2013
Final Site Characterization Reports	February 28, 2014

¹² *Id.*

¹³ These include: Revised Site Characterization Report (March 2012) and 2012 Addendum (January 2013); 2013 On-Site Site Characterization Work Plan (February 2013); 2013 Off-Site Site Characterization Work Plan (March 2013); Interim Remedial Action Plan Addendum (January 2013) and Revised Interim Remedial Action Plan Addendum (July 2013); Draft Final Onsite Feasibility Study (May 2012), and Quarterly Groundwater Monitoring Reports.

¹⁴ Ex. D.

Draft On-Site Feasibility Study	June 20, 2014
Draft Off-Site Feasibility Study	July 25, 2014
Final On-Site Feasibility Study	October 24, 2014
Final [Off-Site] Feasibility Study	November 14, 2014
Draft On-Site Cleanup Plan	December 19, 2014
Draft Off-Site Cleanup Plan	January 23, 2015
Final Cleanup Plans	March 28, 2015

None of the above reports can be undertaken without a sulfolane cleanup number in place. For groundwater, applicable cleanup levels are governed by 18 AAC 75.345(b), which states two relevant alternatives to determine cleanup levels. One alternative is for a responsible party to use cleanup levels stated in Table C to this regulation. 18 AAC 75.345(b)(1). That option is not available here because Table C does not state a value for sulfolane. The second option is to establish groundwater cleanup levels based on an approved site-specific risk assessment conducted under the *Risk Assessment Procedures Manual*.¹⁵ 18 AAC 75.345(b)(2).

In order to determine a risk-based groundwater cleanup level, Flint Hills retained experts at ARCADIS U.S., Inc. (“ARCADIS”) to prepare a site-specific risk assessment. In 2011 ARCADIS submitted to DEC a Work Plan to Conduct a Human

¹⁵ A third option is available for ADEC in situations not applicable here. See 18 AAC 75.345(c).

Health Risk Assessment. After revisions, DEC approved the Work Plan. Flint Hills submitted its Revised Draft Final Human Health Risk Assessment to DEC, on or about May 23, 2012 (the “HHRA”). With appendices, the full report is 746 pages.¹⁶

The key sections of the Flint Hills’ HHRA are:

- Section Three, which addressed risks using toxicity criteria for sulfolane that were described in an EPA report issued in January 2012, titled the “Provisional Peer-Reviewed Toxicity Values for Sulfolane,” and exposure assumptions provided by DEC.
- Section Four, which addressed risks using toxicity criteria developed by ARCADIS based on its extensive review and analysis of scientific literature and data on sulfolane, and two sets of exposure assumptions: exposure assumptions provided by DEC, and exposure assumptions selected by ARCADIS based on the relevant data.
- Section 5, which presented alternative cleanup levels for sulfolane based on the foregoing analysis. These cleanup levels ranged from 14 µg/L to 362 µg/L.

¹⁶ Ex. A.

Less than 60 days after Flint Hills submitted its the HHRA to DEC, DEC sent Flint Hills a one-page letter dated July 19, 2012.¹⁷ Even though DEC acknowledged in the letter that it was still in the process of reviewing the HHRA, DEC concluded that the sulfolane toxicity values reported in EPA's PPRTV should be used to finalize the HHRA, and that the Feasibility Study for the NPR site should use 14 µg/L as "an applicable or relevant or appropriate requirement and in development of remedial action objectives and evaluation of remedial options." This one-page letter did not discuss or analyze any of the scientific analysis submitted by Flint Hills, or give any rationale for directing Flint Hills to use 14 µg/L instead of the other groundwater cleanup levels discussed in the HHRA.

Flint Hills responded to DEC's July 19 correspondence with a letter dated August 20, 2012.¹⁸ Flint Hills expressed its disagreement with DEC's July 19 letter, and specifically stated that it "respectfully disagrees that 14 ppb is the appropriate ACL for the site" and that "the most appropriate and data-supported parameters are expressed in the ARCADIS Scenario in the HHRA. . . . Using the ARCADIS Scenario, . . . the resulting sulfolane ACL is 362 ppb." Flint Hills reserved its right to seek formal or informal review of final DEC actions concerning sulfolane.

¹⁷ Ex. B.

¹⁸ Ex. C.

On November 27, 2013, DEC issued a letter to Flint Hills stating that DEC had completed its review of the HHRA.¹⁹ In this letter, DEC rejected all of Section Four of the HHRA (the discussion of alternatives to the sulfolane toxicity values stated in the EPA's PPRTV report, and alternatives to DEC's exposure assumptions). As discussed in detail below, DEC directed Flint Hills to delete all materials from the HHRA that discussed, proposed or supported cleanup levels other than 14 µg/L. Concurrent with its directives to exclude all contrary data from the reports, DEC stated that it "finds that the groundwater alternative cleanup level for sulfolane derived in Chapter 5 [of the HHRA] of 14 µg/L based on the risk characterization in Chapter 3 [of the HHRA] is protective of human health, safety and welfare, and of the environment and approves the HHRA" on that basis.

Flint Hills reasonably interprets DEC's November 27, 2013 letter as DEC's final decision regarding the cleanup level for sulfolane in groundwater at the NPR site. The letter states that DEC has "completed its review" of the HHRA, and the letter gives Flint Hills final directives concerning the sulfolane cleanup level at the site. DEC provides no indication that further consideration of the sulfolane cleanup level may be requested or will be granted. Therefore, DEC's decision meets the requirement for final department action under 18 AAC 75.385.

¹⁹ Ex. E.

III. FLINT HILLS HAS A DIRECT INTEREST IN DEC'S ERRONEOUS DECISION CONCERNING THE SULFOLANE CLEANUP LEVEL, AND WILL BE DIRECTLY AND ADVERSELY AFFECTED BY THE DECISION

Flint Hills has completed extensive site characterization, interim remedy implementation and risk assessment activities pursuant to relevant provisions of 18 AAC, Article 3 governing site cleanup. Flint Hills is the recipient of DEC's November 27, 2013 letter, rejecting the HHRA and approving 14 µg/L as the cleanup level for sulfolane at the NPR site. As discussed below, DEC's decision to set 14 µg/L as the cleanup level for sulfolane at the NPR site will directly and adversely affect Flint Hills, because achieving this cleanup level would impose enormous costs on Flint Hills that are not justified by risk to human health or the environment.

IV. STATEMENT OF ISSUES FOR HEARING

A. List of Disputed Issues of Law and Fact

1. What groundwater cleanup level should be required for sulfolane at the North Pole Refinery site, under 18 AAC 75.345(b)(2)?
2. In approving a groundwater cleanup level for the North Pole Refinery site, should DEC accept the toxicology values / reference doses for sulfolane derived by ARCADIS U.S., as set forth in Flint Hills' HHRA, including Appendix H (chronic reference dose .01 mg/kg/day and subchronic reference dose .1 mg/kg/day)?

3. Should DEC approve a groundwater cleanup level for sulfolane at the North Pole Refinery site of 362 µg/L, as supported by Flint Hills' HHRA, including Appendix H?
4. In approving a groundwater cleanup level for sulfolane at the North Pole Refinery site pursuant to AAC 75.345(b)(2), should DEC fully consider all materials submitted by Flint Hills in its HHRA, and state its reasoning and rationale for its decision?
5. Was DEC wrong in concluding that the approach taken in Chapter 4 of Flint Hills' HHRA is not an approach authorized by DEC regulations or risk assessment guidance, wrong in excluding Chapter 4 from DEC's consideration on that basis, and wrong in selecting a cleanup level of 14 µg/L on that basis?

B. Relevance of Each Issue to DEC's Cleanup Level Decision

Each issue set forth above is directly relevant to DEC's determination of the sulfolane groundwater cleanup level at the North Pole Refinery under 18 AAC 75.345(b)(2). Issues 2, 3 and 5 are specific elements of the decision that is described in Issue 1, and Issue 4 addresses DEC's process for reaching a decision on the cleanup level.

C. Estimate Of Time Needed For Hearing

Flint Hills estimates that an adjudicatory hearing on the issues raised in this request would take approximately 6 to 8 days.

V. REASONS THAT A HEARING SHOULD BE GRANTED

DEC regulations authorize responsible parties to propose a cleanup level. Flint Hills participated in this process in good faith, submitting a comprehensive analysis of sulfolane toxicity, and proposing a conservative alternative cleanup level supported by good science. Eighteen months later, DEC summarily rejected Flint Hills' submission, without analysis, reasoning or explanation, and ordered Flint Hills to delete all materials that support a cleanup level other than the one selected by DEC. DEC adopted a sulfolane cleanup level that is not consistent with best current science. DEC's approach produced a cleanup level that is 3000 times below the level where the most subtle potential adverse effects were *not* seen in animal studies, and about 11,000 times below the level at which there was even a subtle effect from exposure to sulfolane in animal studies.²⁰

There is inadequate scientific justification for this sulfolane cleanup level. It would impose enormous and unnecessary costs on Flint Hills, while providing no additional benefit to public health or the environment.

²⁰ Ex. A, App. K at pp. 2, 6.

A. DEC's 14 µg/L Cleanup Level is Not Required by the Applicable Alaska Regulations

In its November 27 letter, DEC states that the approach taken by ARCADIS in drafting the HHRA Section 4 is “not an approach authorized by DEC regulations or risk assessment guidance documents and is, therefore, not approved and should not be included in the HHRA.”²¹ The applicable regulations regarding groundwater cleanup levels states, at 18 AAC 75.345(b)(2):

Contaminated groundwater must meet:

(2) an approved cleanup level based on an approved site-specific risk assessment conducted under the *Risk Assessment Procedures Manual* adopted by reference in 18 AAC 75.340.

DEC has pointed to nothing in this regulation or the cited Risk Assessment Manual that supports the conclusion that the approach used in Section 4 of the HHRA is “not authorized by DEC regulations or risk assessment guidance documents.” In fact, as discussed later in this brief, the approach taken in Section 4 of the HHRA is authorized by the regulation and guidance documents.

In its July 19, 2012 letter, DEC stated that an EPA and DEC hierarchy “identifies use of the PPRTV when no Integrated Risk Information System (“IRIS”)

²¹ Ex. E.

value is available.”²² As a source for this “hierarchy,” DEC referred to DEC’s draft Risk Assessment Procedures Manual (November 2011). This draft manual, while available as a guidance document for ADEC, is not in effect as a regulation. The applicable Risk Assessment Procedures Manual (2000) (referenced in the regulation above) does not refer to EPA PPRTV values at all. In addition, the 2011 Draft Manual does not require rigid application of the PPRTV toxicity values, with no discretion to use other toxicity values that are supported by science. To the contrary, relevant EPA guidance describing this hierarchy says that officials have discretion to take different approaches: “EPA and state personnel may use and accept other technically sound approaches, either on their own initiative, or at the suggestion of potentially responsible parties, or other interested parties.”²³

²² Ex. B.

²³ U.S. EPA, Human Health Toxicity Values in Superfund Risk Assessments, Directive 9285.7-53 at p. 1 (EPA 2003). DEC cited this publication in its July 19, 2012 letter.

When DEC approved the Work Plan for the HHRA in December 2011, EPA had not yet issued the PPRTV for sulfolane. The Work Plan recognized that EPA might issue a PPRTV before ARCADIS finished its work on the HHRA. In that event, the Work Plan did not direct ARCADIS to simply adopt the PPRTV toxicity value and proceed to calculate the cleanup level on that basis. To the contrary, the Work Plan said that if EPA issued a PPRTV, ARCADIS would evaluate the toxicity value derived by EPA, but that toxicity criteria for sulfolane developed by other reputable entities would also be reviewed. Second Revision, Work Plan to Conduct a [HHRA], Dec. 2011, at pp. 36-37. That is what ARCADIS did.

Based on all the above, DEC's statement that Section 4 of the HHRA is contrary to DEC regulations is wrong. Reliance by DEC on such a regulatory interpretation to support its 14 µg/L cleanup level is, therefore, not appropriate.

B. DEC Refused to Consider Relevant Scientific Information Concerning the Cleanup Level for Sulfolane, and Rejected Proposed Alternative Cleanup Levels Without Stating Any Basis for Its Decision

1. Flint Hills Followed DEC Regulations and Process to Arrive at a Cleanup Level for Sulfolane

DEC regulations provide two relevant alternatives for determining groundwater cleanup levels. The first alternative is for DEC to go through a rulemaking process and set a groundwater cleanup level which is then included in 18 AAC 75.345(b)(1), Table C. The second option (discussed in Section V.A above) is for a responsible party to conduct a risk assessment and for DEC to approve a site-specific cleanup level based on an approved site-specific assessment conducted under the Risk Assessment Procedures Manual adopted in 18 AAC 75.340.

18 AAC 75.345(b)(2).²⁴

Notably, the site-specific option is available even if Table C states a value. In that situation, the responsible party can still seek approval of an alternative groundwater cleanup level. Here, however, section 345(b)(1) and Table C simply did not apply, because Table C does not have a published value for sulfolane. In other

²⁴ A third option in the regulation is not applicable here. 18 AAC 75.345(c).

words, because DEC has not established a cleanup value by rulemaking, the sulfolane cleanup level at the North Pole refinery site must, necessarily, be established through an approved risk assessment.

Flint Hills followed DEC's regulations and procedures in good faith, to propose a cleanup level for sulfolane at the North Pole refinery. Flint Hills hired experienced experts at ARCADIS to assist Flint Hills in submitting materials to DEC, including a HHRA. In 2011, ARCADIS participated in extensive discussions with DEC, and submitted a Risk Assessment Work Plan that DEC approved.

On May 23, 2012, Flint Hills submitted a 746-page HHRA, prepared by ARCADIS.²⁵ The HHRA included reports from ARCADIS's principal toxicologist, Dr. Brian Magee, and Dr. William Farland, former EPA Deputy Assistant Administrator for Science.²⁶ The ARCADIS HHRA analyzed all available data concerning potential human health risks attributable to sulfolane exposure. This report included extensive and careful assessment of the toxicological data, and addressed the ways this data had been evaluated by other experts and regulatory agencies.

²⁵ Ex. A.

²⁶ Ex. A, Apps. H, K.

As part of its analysis, ARCADIS analyzed a report that had been issued four months earlier (January 2012), by the EPA's Superfund Health Risk Technical Support Center entitled "Provisional Peer-Reviewed Toxicity Values for Sulfolane." This PPRTV report was prepared by a contractor hired by EPA. EPA's PPRTV report did not involve any new testing of how sulfolane affects animals or humans. The EPA process simply analyzed prior studies and data, and from these studies and data reached conclusions about provisional reference doses for sulfolane. A chronic provisional reference dose of .001 mg/kg/day and a subchronic reference dose of .01 mg/kg/day were identified.²⁷ In the PPRTV report, these values were not translated into cleanup levels for sulfolane.

It is important to note that EPA PPRTV reports are not the primary (nor the most thorough) review done at the EPA to set toxicity values. The provisional reference doses are used by EPA to set Regional Screening Levels ("RSLs") for purposes of the Superfund Chemical Data Matrix, where they are used as a screening tool to identify potential chemicals of concern at sites that may warrant additional investigation. Per EPA itself, it should be emphasized that RSLs "are not cleanup

²⁷ The reference dose is an estimate of a daily oral exposure to the human population that is likely to be without an appreciable risk of deleterious effects during a lifetime. EPA, Risk Assessment, Step 2 - Dose Response Assessment, at epa.gov/riskassessment/dose-response.htm.

standards” and are meant for use in preliminary assessments.

http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm.²⁸

In its report, ARCADIS fully considered the EPA PPRTV work. Based on its independent review of the data and relevant scientific principles, ARCADIS concluded that it was unable to endorse the provisional reference doses set forth in EPA’s PPRTV Report (for detailed reasons set forth in the HHRA, including Appendices H and K).²⁹ ARCADIS made an independent derivation of reference doses for sulfolane in accordance with the best available science, and EPA guidance.³⁰ ARCADIS determined a chronic reference dose for sulfolane of .01 mg/kg/day, and a subchronic reference dose of .1 mg/kg/day.³¹ From these reference doses, ARCADIS developed groundwater cleanup levels for sulfolane.³²

In the HHRA, ARCADIS presented three alternative sulfolane cleanup levels.

²⁸ Similarly, the federal Agency for Toxic Substances and Disease Registry (February 10, 2010 and May 2, 2011) issued two Health Consultations setting a “public health action level” for sulfolane. This type of value is intended to serve as a screening tool to help decide whether to more closely evaluate exposure to a substance, but is not meant for use in conducting human health risk assessments or setting cleanup levels. Ex. A, App. H, Magee Report at pp. 2-3. The second ATSDR report identified screening levels for sulfolane of 70 µg/L (adults), 32 µg/L (children) and 20 µg/L (infants). Serious deficiencies in the study used as the basis for the ATSDR level were identified by both ARCADIS and the EPA.

²⁹ Ex. A at p. 96 and App. H, Magee Report at p. 1.

³⁰ Ex. A at pp. 93-97 and App. H.

³¹ Ex. A at p. 96 and App. H.

³² Ex. A at p. 123 and Table 5.2.

One alternative is based on the provisional toxicity values in the EPA PPRTV Report. The other two alternatives reflect the toxicity value for sulfolane determined by ARCADIS based on the best available science and EPA guidance, as set forth in the HHRA. The three alternative sulfolane cleanup levels are set forth in the table below. The sulfolane cleanup levels in column A reflect the provisional toxicity values in EPA's January 2012 report. The sulfolane cleanup levels in columns B and C reflect the toxicity values derived by ARCADIS.³³

SUMMARY OF ALTERNATIVE CLEANUP LEVELS			
Receptor	A ACL - PPRTV Scenario	B ACL - ARCADIS Comparative Scenario	C ACL - ARCADIS Scenario
Infant (0-1 yr.) – Subchronic	64 µg/L	637 µg/L	664 µg/L
Child (1-6 yrs.) – Chronic	14 µg/L	145 µg/L	155 µg/L
Child (1-6) yrs. – Subchronic	--	--	1,550 µg/L
Adult – Chronic	34 µg/L	343 µg/L	362 µg/L

³³ Ex. A at p. 123 and Table 5.2. More specifically, the PPRTV Scenario in Column A pairs the EPA-derived toxicity value with exposure parameters selected by DEC. The ARCADIS Comparative Scenario in Column B pairs the toxicity value derived by ARCADIS with DEC's exposure parameters. The ARCADIS Scenario in Column C uses the toxicity values and exposure parameters derived by ARCADIS to reflect best science and guidance.

2. DEC Rejected the Sulfolane Toxicity Values and Cleanup Levels Proposed by Flint Hills Without Analysis or Explanation

Less than 60 days after Flint Hills submitted its HHRA, DEC issued a one-page letter dated July 19, 2012.³⁴ Although this letter acknowledged that DEC was still in the process of reviewing the HHRA, DEC went on to assert that EPA's PPRTV should be used to finalize the HHRA, and that the Feasibility Study for the site should use 14 µg/L as "an applicable or relevant or appropriate requirement and in development of remedial action objectives and evaluation of remedial options." This one-page letter did not discuss or analyze any of the scientific analysis submitted by Flint Hills/ARCADIS. It did not state any rationale for directing Flint Hills to use 14 µg/L as the sulfolane cleanup level, and did not explain any rationale for its failure to consider (much less reject) the alternative cleanup levels for sulfolane presented in the HHRA.

Sixteen months later, on November 27, 2013, DEC issued a two-page letter to Flint Hills concerning the HHRA, along with DEC's comments on the document.³⁵ DEC's November 27, 2013 letter stated that DEC had now completed its review of the HHRA. As noted in Section V.A above, DEC rejected the entire section of the HHRA that discussed alternatives to the provisional sulfolane toxicity values stated in

³⁴ Ex. B.

³⁵ Ex. E.

the EPA's PPRTV and alternatives to DEC's exposure assumptions, and DEC rejected all alternatives to the 14 µg/L cleanup level for sulfolane. Concurrent with its rejection of all contrary data and analysis, DEC stated that it "finds that the groundwater alternative cleanup level for sulfolane derived in Chapter 5 [of the HHRA] of 14 µg/L based on the risk characterization in Chapter 3 [of the HHRA] is protective of human health, safety and welfare, and of the environment, and approves the HHRA" on that basis.³⁶

Despite the passage of 16 months since its July 2012 letter, and despite the statement that DEC has now completed its review of the HHRA, DEC's November 27 letter contains no discussion of any reasoning behind DEC's decision on the applicable toxicity value, its choice of exposure assumptions, or its adoption of 14 µg/L as the alternative cleanup value. The November 27 letter is conclusory, and contains no explanation of the agency's rationale other than an erroneous statement that the approach is not authorized by DEC regulations and assessment guidance.

A table of comments attached to the November 27 letter provides no further analysis or explanation for DEC's rejection of the toxicity values doses derived by

³⁶ Note that this letter was received by Flint Hills just two and a half weeks before major reports were due to DEC. These reports had to use a cleanup level for analysis. The letter gave Flint Hills' consultants no time to address the DEC demands in the November 27th letter. The reports due to DEC on December 20th are the Onsite and Offsite Site Characterization Reports and the Conceptual Site Model.

ARCADIS, or the alternative cleanup levels proposed in the HHRA.³⁷ DEC simply repeated its summary rejections, based on the directives DEC issued in July 2012 (before it had completed its review of the HHRA). DEC explicitly stated that it will not comment on the portions of the HHRA that are contrary to its thinking. As the following comments demonstrate, rather than address and analyze those portions of the HHRA that do not support its decision, DEC simply ordered them expunged from the record, as if they never existed:

[DEC's July 19 2012] letter should be referenced and all references to a range of potential ACLs at the site must be removed. The ARCADIS Comparative Scenario, as presented in Chapter 4 of the HHRA, is not acceptable or approved by DEC.

....

Chapter 4, including supporting appendices . . . shall not be included in the HHRA. The approach taken in Chapter 4, as well as supporting appendices, is not an approach supported by DEC regulations or guidance documents and is, therefore, not approved. No additional comments will be made on these sections of the HHRA.

....

Chapter 5 of the HHRA must only include alternative cleanup levels (ACLs) derived using the reference dose from the [US EPA's] Provisional Peer-Revised [sic] Toxicity Value (PPRTV) for Sulfolane (dated January 30, 2012) and the DEC approved exposure assumptions. The appropriate ACL for sulfolane in groundwater is 14 µg/L, derived from the PPRTV RfD and the DEC-approved exposure assumptions.

³⁷ Ex. E.

....

Derivation of an alternative reference dose for sulfolane is not supported by DEC. The memo by Dr. Brian Magee must be removed from this appendix. No further comments on the memo from this appendix will be made. Reference to this memo must be eliminated from the sulfolane toxicology profile included in this appendix.

DEC's statements in its November 27 letter and comments vividly demonstrate why an administrative hearing is needed. Instead of addressing the information submitted by Flint Hills and stating reasons for its decisions, DEC simply ordered all inconvenient or conflicting data removed from the record, and directed compliance with a cleanup level stated in the letter. This kind of unsupported agency decision-making cannot be sustained.³⁸

3. The Cleanup Level Selected By DEC Is Not Supported By Best Current Science

DEC's selection of 14 µg/L as the groundwater cleanup level is not consistent with current EPA guidance or best science and policy decision-making, and is contrary to the sound approach taken in several other jurisdictions that have considered sulfolane exposure limits. The Commissioner should order a hearing to evaluate the appropriateness of the 14 µg/L limit.

³⁸ "The very essence of arbitrariness is to have one's status redefined by the state without an adequate explanation of its reason for doing so." *Ship Creek Hydraulic Syndicate v. State*, 685 P.2d 715, 717 (Alaska 1984) (quoting Rabin, 44 U.Chi.L. Rev. 60, 77-78 (1976)). See also *Kachemak Bay Watch, Inc. v. Noah*, 935 P.2d 816, 822 & n. 4 (Alaska 1997) (reversing DNR decision).

**a. DEC Imposed EPA's Provisional Toxicity Value
Without Good Scientific Reason**

At the core of DEC's error is its reliance on the provisional toxicity value determined through an EPA process designed to set screening levels for Superfund sites. There is a ten-fold difference between these screening levels (a chronic value of .001 mg/kg/day, and a subchronic value of .01 mg/kg/day) and the oral reference doses derived by ARCADIS and fully supported by other independent studies: .01 mg/kg/day for chronic exposure, and .1 mg/kg/day for subchronic exposures.

A major reason for the difference is explained by Dr. Brian Magee, in Appendix H to the HHRA.³⁹ He observes that EPA reached its conclusion on the reference doses by emphasizing an approach that used the "no observed adverse effect level" (NOAEL) for sulfolane to determine the reference dose, rather than using a "benchmark dose modeling" approach that is preferred as the current standard and is recommended in EPA's own guidance.⁴⁰ There are serious limits to the NOAEL approach, including its dependence on the placement of the particular doses tested in the studies: gaps between doses can lead to large exposure ranges that are not

³⁹ Ex. A., App. H, Magee Report. See also Ex. A at p. 96.

⁴⁰ Ex. A, App. H, Magee Report at p. 8. In general terms, a "No-Observed-Adverse-Effect Level" (NOAEL) is the highest exposure level at which no statistically or biologically significant increases are seen in the frequency or severity of adverse effect between the exposed population and the control population. EPA, Risk Assessment, Step 2 - Dose Response Assessment, at epa.gov.riskassessment/dose-response.htm.

characterized for risk. In contrast, benchmark dose modeling uses all the data and provides an estimate of the entire dose-response curve. EPA said that it did not use the benchmark dose modeling approach in the sulfolane PPRTV because of a lack of “fit” with the data, but EPA failed to use a standard, current statistical technique that would have enabled EPA to achieve the desired “fit” for use of the benchmark dose modeling approach.⁴¹ When ARCADIS used this statistical technique, ARCADIS obtained an “excellent fit” for the sulfolane data.⁴² EPA itself has used this statistical technique, and in a situation very similar to the data set presented for sulfolane.⁴³ This standard technique would have allowed EPA to use the preferred benchmark dose modeling approach, as demonstrated by ARCADIS and others. Applying the benchmark dose approach yields more accurate values, in this case significantly higher than the provisional reference doses produced by using the NOAEL data. These higher reference doses translate into a significantly higher groundwater cleanup level for sulfolane, while still being fully protective of the public health.

In calculating the provisional reference dose, EPA also applied the maximum “uncertainty factor” allowed by EPA guidance. The combination of using a “NOAEL” level as a starting point, and then applying a high (maximum) uncertainty factor

⁴¹ This statistical technique involves logarithmic transformation of the data.

⁴² Ex. A at 96.

⁴³ Ex. A, App. H, Magee Report at p. 8.

produces an excessively conservative cleanup level. A safe drinking water value based on these calculations is 3000 times below the level where the most subtle potential adverse effects were *not* seen in animal studies, and about 11,000 times below the level at which there was even a subtle effect from exposure to sulfolane in animal studies.⁴⁴ There is inadequate scientific justification for this cleanup level.

DEC's directive to use 14 µg/L as the sulfolane cleanup level is scientifically unsupportable for an additional reason. DEC's 14 µg/L cleanup level is based on a chronic exposure scenario for a child. This means that in setting the cleanup level, DEC assumed that a person exposed to sulfolane would have a child's body weight throughout their entire lifetime. DEC should have determined the cleanup level based on chronic exposure for adults, because the chronic exposure value for adults is developed in a way that fully accounts for children or sensitive populations.⁴⁵ The most current DEC guidance recommends an adult scenario to derive cleanup levels

⁴⁴ Ex. A, App. K at pp. 2, 6.

⁴⁵ As Dr. Farland explained, consideration of sensitive populations, including children, is built into the process of setting an oral reference dose for exposure to a chemical. Therefore, unless there are special considerations of risk to developing children posed by a particular chemical, a scenario using an adult body weight for chronic exposure is considered to be protective of human health. The sulfolane database reveals no special risks for children, meaning that an adult scenario is appropriately health protective. Exhibit A, App. K at p. 7. See also Ex. A at pp. 62 and 118.

for non-carcinogenic chemicals, which is consistent with calculations used by USEPA and states in accordance with the Safe Drinking Water Act.⁴⁶

b. Other Scientists and Regulators Support the Cleanup Levels Proposed by Flint Hills.

ARCADIS is not alone in its evaluation of the toxicity of sulfolane and development of acceptable cleanup levels. To the contrary, EPA's provisional toxicity values and DEC's sulfolane cleanup level (14 µg/L) are inconsistent with determinations made by other regulatory bodies, by a significant margin. Four other evaluations have reached essentially the same conclusion as ARCADIS with respect to the chronic toxicity value/reference dose for sulfolane, .01 mg/kg/day, and reached similar conclusions regarding the cleanup level for sulfolane in groundwater:⁴⁷

- Texas: In 2011, the Texas Commission on Environmental Quality ("TCEQ") identified a chronic response dose of .013 mg/kg/day, which TCEQ translated in 2012 to a 320 µg/L groundwater cleanup level. The toxicity value of .013 can be rounded to .01, which is the same chronic dose value identified by ARCADIS.

⁴⁶ 7/18/12 Alternative ACL Calculation for Sulfolane in Groundwater, Dr. Brian Magee, pp. 2, 4.

⁴⁷ Ex. C and Ex. A, App. H, Magee Report.

- British Columbia Ministry of Water, Land and Air Protection: The British Columbia Ministry arrived at a toxicity value of .0097 mg/kg/day, which can be rounded to .01, the same value derived by ARCADIS. This value was used to set a 260 µg/L drinking water guideline for children and a 460 µg/L guideline for adults.
- Canadian Council of Ministers of the Environment: The CCME also identified a toxicity value of .0097 mg/kg/day, which can be rounded to .01 mg/kg/day--again, the same value identified by ARCADIS.
- ToxStrategies: Sulfolane analysis by ToxStrategies (2012) derived a “lowest, most conservative” value of .01 mg/kg/day, the same level as proposed by ARCADIS. This translates to a cleanup level of 365 µg/L. ToxStrategies’ work has been published in a peer-reviewed journal. C. Thompson, et al., 33 Journal of Applied Technology 1395 (Dec. 2013).

In summary, in each instance these regulators or scientists arrived at a chronic toxicity value for sulfolane that is essentially the same as the toxicity value determined by ARCADIS, and submitted by Flint Hills. From these toxicity values, regulators determined cleanup levels for sulfolane similar to the 362 µg/L level proposed by ARCADIS, and certainly multiple times higher than the 14 µg/L level imposed by DEC. The scientific data presented by ARCADIS on behalf of Flint Hills

and the consistent results reached by other scientists and regulators raise serious questions about DEC's adoption of a standard developed by EPA and demonstrate a basis for the Commissioner to order a hearing to evaluate this evidence, and determine a cleanup level for sulfolane.

4. DEC's Arbitrary And Unexplained Decision To Choose 14 μ G/L as the Sulfolane Cleanup Level Will Impose Enormous and Unnecessary Cleanup Costs

Selection of the proper ACL for sulfolane in groundwater is central to the future direction of the NPR cleanup. Tens of millions of dollars and decades of future effort will be wasted if DEC adopts an unjustifiably low cleanup level. According to Alaska regulations and DEC guidance, the cleanup level is meant to reflect risk-based considerations for human health and the environment. When the cleanup level is derived through choices made in the absence of good scientific reasons, the result may alarm the public, require unnecessary controls, and impact property values and population growth without providing any more protection for the public health than would a carefully derived, data-supported value.

The 362 μ G/L cleanup level proposed by Flint Hills is protective of human health and the environment, by a significant margin, and no additional protection would be gained by selecting an artificially low standard set through choices that do not reflect the science and data. As noted above, comparable numbers have already been adopted in other jurisdictions. The selected standard will dictate the scope of

remedial alternatives that are considered during the Feasibility Study (FS) process, which is currently scheduled for draft submittal to DEC by June (onsite) and July (offsite) 2014. The cleanup level will also substantially affect the scope of groundwater monitoring required in the short and long term. The cleanup level not only affects the scope of groundwater monitoring and cleanup, but also the soil cleanup level, which is derived from the groundwater cleanup level. Ultimately, the groundwater cleanup level will be a central consideration in determining where future cleanup actions will take place and how long they will last. These decisions will be made in the Cleanup Plans that are currently due in draft form to the DEC by November (onsite) and December (offsite) 2014. Because the majority of groundwater impacts at the site are greater than DEC's stated 14 µg/L cleanup level, the standard, if applied, is expected to drive the expenditure of substantial resources to achieve this artificial standard with no meaningful additional level of protection to public health or the environment.

5. Due to Steps Already Taken by Flint Hills to Protect Residents From Any Risk from Sulfolane Exposure, DEC has Time to Properly Evaluate the Cleanup Level at the Site.

DEC may oppose a hearing on grounds that a hearing to address the cleanup level will delay completion of other steps in the cleanup planning sequence, and thus ultimately delay cleanup activities. Flint Hills disagrees. First, any problem with timing is DEC's own making. Flint Hills submitted the HHRA to DEC in May 2012.

DEC took 18 months -- until November 2013 -- to issue a decision on the HHRA.

Second, as detailed below, because Flint Hills has acted affirmatively to protect the public health and limit off-site migration, the sulfolane contamination situation is stabilized, and delay in commencing further cleanup activity poses no threat to people or the environment. This means there is time to make a reasoned determination about the right cleanup level for sulfolane, before embarking on extraordinarily expensive cleanup activities that offer no meaningful added protections for public health.

a. Groundwater Extraction and Treatment

Flint Hills is currently operating a groundwater extraction system that removes groundwater from remediation wells on the facility, treats the extracted groundwater, and discharges the treated water into the South Gravel Pit. Approximately 155 million gallons of groundwater were extracted and treated in 2013 (through September). The groundwater extraction system is capturing the bulk of the sulfolane-impacted groundwater coming from sulfolane source areas at the site.

In response to the discovery of sulfolane impacts in groundwater, Flint Hills completed extensive upgrades to the groundwater extraction system since 2009 to increase the remediation efficacy, expand the width and depth of capture and increase operational efficiency. In addition to treating sulfolane, the groundwater extraction system is also recovering light non-aqueous phase liquid and petroleum hydrocarbon-impacted groundwater.

A groundwater extraction system expansion is underway and additional groundwater extraction wells and a second treatment system will be installed to the west of the current groundwater extraction well network. With that expansion, the remediation system design will offer comprehensive capture and treatment of sulfolane and all other COCs in groundwater from all identified sources within the refinery property. The system expansion is scheduled to be operational by the summer of 2014.

b. Alternative Water Solutions Program

Flint Hills immediately began sampling private wells of residents and businesses near the NPR upon detection of sulfolane in an offsite monitoring well in October 2009. Alternative drinking water sources were provided to those with impacted wells. Approximately 800 private wells have been sampled and 354 have contained sulfolane as of September 2013. Flint Hills additionally offered to collect samples from garden wells for property owners and properties within the zone of detectable sulfolane concentrations area were offered an outside hose spigot connected to the property's city-water system or were offered a bulk tank for gardening.

Flint Hills has completed the following mitigation actions to address potential drinking water risks associated with offsite dissolved-phase sulfolane impacts:

- Replaced municipal wells owned by the City of North Pole that were affected by sulfolane.
- Extended municipal water service to residents within the City of North Pole service area.
- Provided alternative water solutions to approximately 350 residences and businesses with wells that have tested positive for sulfolane.
 - As of September 30, 2013, Flint Hills has installed and maintains 158 point of entry (POE) treatment systems;
 - 113 bulk water tanks have been installed;
 - 32 properties have chosen ongoing bottled water service as their permanent solution; and
 - 48 garden tanks have been installed for those outside the City's water main system.
- Established a buffer zone around the known extent of sulfolane where private wells have been sampled and bottled water is provided as a precautionary measure to prevent exposure to sulfolane.

VI. PROPOSED ALTERNATIVES TO DEC'S DECISION

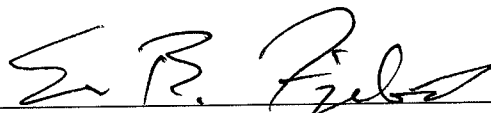
Pursuant to 18 AAC 15.200(a)(3)(D), Flint Hills requests that DEC accept the toxicology values / reference doses for sulfolane derived by ARCADIS, set forth in Flint Hills' HHRA, including Appendix H (chronic reference dose .01 mg/kg/day and subchronic reference dose .1 mg/kg/day), and accept a cleanup level for sulfolane at the North Pole Refinery site of 362 µg/L.

VII. CONCLUSION

For the foregoing reasons, Flint Hills respectfully requests that the Commissioner grant its Request for an Adjudicatory Hearing.

DATED: December 20, 2013.

PERKINS COIE LLP

By: 

Eric B. Fjelstad, Alaska Bar No. 9505020

EFjelstad@perkinscoie.com

James N. Leik, Alaska Bar No. 8111109

JLeik@perkinscoie.com

Attorneys for Requestor